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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/751,378	01/05/2004	Shoichiro Usui	F-8098	2639

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JORDAN AND HAMBURG LLP
122 EAST 42ND STREET
SUITE 4000
NEW YORK, NY 10168

EXAMINER	
FORD, JOHN K	

ART UNIT	PAPER NUMBER
3753	

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/751,378	USUI, SHOICHIRO	
	Examiner	Art Unit	
	John K. Ford	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 12/09/05

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-7 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-7 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Applicant's RCE of 12/09/2005 has been processed and the amendment of 11/15/2005 has been carefully considered.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as obvious over Charlton et al (USP 5,732,688) in view of any one of JP 2003-278544, JP 2002-285843, Plaff et al (USP 6,343,572), Derwent publication 2002-423613, JP 08-261071 or Saito et al (USP 6,758,173).

Charlton discloses an EGR cooler in Figures 2 and 3 that has a valve 86 controlling the engine coolant flow responsive to exhaust gas temperature to maintain the exhaust gas temperature at roughly 150 degrees C (see Figure 4, far right), for the purpose of reducing fouling of the EGR cooler (col. 8, lines 54-59).

Regarding the 120-150 degree C limitation in claim 5, to have set the minimum temperature to any particular value in the 120-150 degrees C range to advantageously prevent fouling would have been obvious to one of ordinary skill since it appears from Charlton that temperatures in this range reduce fouling and would have been obvious to one of ordinary skill for that reason.

Regarding the boiling point of the coolant, Charlton explicitly contemplates high temperature coolants (with boiling points higher than conventional water-glycol engine coolant fluid) in col. 6, lines 39-51, which is incorporated here by reference. Moreover, since claim 1 only requires the boiling point to be greater than 150 degrees C, official notice is taken of the fact that conventional water-glycol engine coolant fluid (ethylene glycol based products such as "ZEREX" and other antifreeze sold in supermarket and auto-supply stores in the United States) have a boiling point of 106 degrees C (in a 50/50 mix with water) at atmospheric pressure. At higher pressures the ethylene glycol boils at high temperatures. For example, at 14-15 psi above atmospheric pressure the boiling point such antifreeze increases to 131 degrees C. At even higher pressure the boiling point rises to 150 degrees C and then higher as pressure goes up further. This behavior is shown in col. 10, lines 40-60 of USP 5,868,105, which forms no part of this rejection except to show conventional knowledge in the field. Therefore, Charlton, by disclosing that his coolant has a boiling point higher than conventional water-glycol engine coolant fluid is deemed to be inherently disclosing coolant with a boiling point above 150 degrees C. The coolant temperature in Charlton (see Figure 4) is approximately 100 degrees C, and that Charlton in col. 6, lines 31-51 contemplates using coolants with higher boiling points than conventional water-glycol coolants. Specifically at least 110 degrees C is contemplated in col. 8, lines 46-50 as a coolant temperature. Thus, the boiling point of the coolant in Charlton must be at least 110 degrees C. To have selected 150 degrees C coolant so that there was some margin of safety to advantageously avoid "boil-over" would have been obvious.

The prior art to JP 2003-278544, JP 2002-285843, Plaff et al (USP 6,343,572), Derwent publication 2002-423613, JP 08-261071 or Saito et al (USP 6,758,173), each individually teach an exhaust gas cooler that is connected to a liquid circulating coolant circuit that has an expansion tank associated with it. See JP 2003-278544, tank 35 and the description thereof, JP 2002-285843, tank 23 with a liquid coolant level "x", Plaff et al (USP 6,343,572), with exhaust gas cooler 17 and expansion tank 25, Derwent publication 2002-423613, EGR cooler 15 and reservoir tank 39, JP 08-261071, EGR cooler 13 and reserve tank 11 or Saito et al (USP 6,758,173), EGR cooler 31 and an expansion tank shown (but not described) to the right of radiator 27. In view of anyone of these teachings it would have been obvious to have equipped the system of Charlton (Figure 2) with an expansion tank to take up the temperature induced expansion of the coolant so that the system advantageously wouldn't explode or undergo extreme temperature induced expansion and damage during use.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art as applied to claims 1-5 above, and further in view of JP '956 and optionally Malatto et al or Paas (USP 5,785,030).

JP '956 discloses an EGR cooler 20 that has a valve 40 controlling the engine coolant flow responsive to exhaust gas temperature to maintain the exhaust gas temperature at a minimum of " for example, 100 degrees C ", for the purpose of

preventing the formation of sulfuric acid in the exhaust. This is disclosed at step S28 in Figure 2 where the question is posed: Is EGR gas temperature greater than or equal to T3? In the disclosure an example temperature of 100 degrees C is given for T3. If the answer is "No" then the water valve 40 is set to a minimum position. This adds further credence to the remarks above that temperatures in a range of 120 degrees C and 150 degrees C are desirable from the standpoint of avoiding fouling and degradation of the cooler by the action of the somewhat caustic nature of the exhaust gasses themselves.

Malatto merely teaches lubricating oil as an extremely high boiling point engine coolant (well over 150 degrees C, typically about 300 degrees C), which would have also been obvious to have used for the reasons discussed in Malatto.

Similarly, Paas teaches cooling exhaust gasses in an EGR cooler to temperatures not exceeding 300 F (150 degrees C). This adds further credence to the remarks above that temperatures in a range of 120 degrees C and 150 degrees C are desirable from the standpoint of avoiding fouling and degradation of the cooler by the action of the somewhat caustic nature of the exhaust gasses themselves.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of the prior art as applied to claims 1 and 2 above, and further in view of JP 2001-173519 and optionally JP 03-183919.

JP 2001-173519 shows a jacket sensor 62 similar to the jacket sensor 98 in Charlton. In paragraph 0045 of the machine translation of '519 attached thereto, it is disclosed that as an alternative to the jacket temperature, the wall surface 56a temperature could be used instead. To have modified Charlton's jacket sensor 98 by placing it on one of the tubes instead of the jacket wall would have been obvious in view of this teaching of equivalency from paragraph 0045 of JP '519. It would appear that one advantage to this latter configuration (i.e. tube wall temperature sensing) is faster response to changing conditions. JP 03-183919 is cited simply to show that mounting temperature sensors on tube walls is old and well known in the art.

Any inquiry concerning this communication should be directed to John Ford at telephone number 571-272-4911.